

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A magnetic resonance imaging apparatus, for providing MRA image data without use of contrast agent, said apparatus comprising:
an RF coil unit which generatestransmits RF pulses toward a subject, and which receives an MR signal from the subject in the absence of contrast agent in said subject;
gradient magnetic field coils which generate a gradient magnetic field for slice selection, a gradient magnetic field for phase encoding and a gradient magnetic field for frequency encoding, respectively;
an arithmetic unit which generates MRA image data based on the basis of the MR signal including a subtraction image related to a systolic phase and a diastolic phase on the basis of the MR signals acquired during the systolic phase and the diastolic phase;
and
a sequence controller which controls the secondphase encoding gradient magnetic field coils in order to generate flow pulses for dephasing or rephasing a MR spin of a blood flow within said subject, in the same direction as that of the phase encoding gradient magnetic field.

2. (Currently Amended) A magnetic resonance imaging apparatus according to as in claim 1, wherein the flow pulses are flow compensation pulses or flow spoiled pulses.

3. (Currently Amended) A magnetic resonance imaging apparatus according to as in claim 1, wherein said sequence controller controls the third frequency encoding gradient magnetic field coils in order to generate otheradditional flow pulses in the same direction as that of the frequency encoding gradient magnetic field.

4. (Currently Amended) A magnetic resonance imaging apparatus according to as in claim 3, wherein the first-mentioned flow pulses are flow compensation pulses, and the otheradditional flow pulses are also flow compensation pulses.

5. (Currently Amended) A magnetic resonance imaging apparatus according to as in claim 3, wherein the first-mentioned flow pulses are flow spoiled pulses, and the otheradditional flow pulses are also flow spoiled pulses.

6. (Currently Amended) A magnetic resonance imaging apparatus according to as in claim 3, wherein the first-mentioned flow pulses are flow spoiled pulses, and the otheradditional flow pulses are flow compensation pulses.

7. (Currently Amended) A magnetic resonance imaging apparatus according to as in claim 3, wherein the first-mentioned flow pulses are flow compensation pulses, and the otheradditional flow pulses are flow spoiled pulses.

8. (Currently Amended) A magnetic resonance imaging apparatus according to as in claim 1, wherein said sequence controller controls the firstslice selection gradient

magnetic field coils ~~in order~~ to generate a slice encoding gradient magnetic field in the same direction as ~~that of~~ the slice selecting gradient magnetic field.

9. (Currently Amended) A magnetic resonance imaging method for providing MRA image data without use of contrast agent, said method, comprising the steps of:

generatingtransmitting RF pulses toward a subject while also applying, together with a gradient magnetic field for slice selection in the absence of contrast agent in said subject;

generating a gradient magnetic field for phase encoding;

generating a gradient magnetic field for frequency encoding;

generating flow pulses for dephasing or rephasing aMR spin of a blood flow within the subject, in the same direction as ~~that of~~ the phase encoding gradient magnetic field;

receiving an MR signal from said subject; and

generating MRA image data based on the basis of the MR signal in the absence of contrast agent in said subject including a subtraction image related to a systolic phase and a diastolic phase on the basis of the MR signals acquired during the systolic phase and the diastolic phase.

10. (Currently Amended) A magnetic resonance imaging method according toas in claim 9, wherein the flow pulses are flow compensation pulses or flow spoiled pulses.

11. (Currently Amended) A magnetic resonance imaging method ~~according to as in~~ claim 9, wherein ~~other~~additional flow pulses are generated in the same direction as ~~that of~~ the frequency encoding gradient magnetic field.

12. (Currently Amended) A magnetic resonance imaging method ~~according to as in~~ claim 11, wherein the ~~other~~additional flow pulses are flow pulses of the same type as ~~that of~~ the first-mentioned flow pulses.

13. (Currently Amended) A magnetic resonance imaging method ~~according to as in~~ claim 11, wherein the ~~other~~additional flow pulses are flow pulses of a type different ~~from that of~~than the first-mentioned flow pulses.

14. (Currently Amended) A magnetic resonance imaging method ~~according to as in~~ claim 9, wherein a gradient magnetic field for slice encoding is generated in the same direction as ~~that of~~ the slice selecting gradient magnetic field.

15. (Currently Amended) A magnetic resonance imaging method for providing MRA image data without use of contrast agent, said method, comprising the steps of:
executing a prep scan in the absence of contrast agent in said subject by a first pulse sequence which includes flow pulses for dephasing or rephasing aMR spin of a blood flow within a subject, together with RF pulses, a gradient magnetic field for slice selection, a gradient magnetic field for phase encoding and a gradient magnetic field for frequency encoding, the flow pulses of the first pulse sequence being generated in the same direction as ~~that of~~ the phase encoding gradient magnetic field;

determining a condition of said flow pulses based on the basis of an MR signal
~~which has been~~ acquired by the prep scan; and
executing an MRA imaging scan in the absence of contrast agent in said subject by
a second pulse sequence which includes flow pulses corresponding to the determined
condition, together with the RF pulses, the slice selecting gradient magnetic field, said
phase encoding gradient magnetic field and the frequency encoding gradient magnetic
field, the flow pulses of the second pulse sequence being generated in the same direction
as ~~that of~~ said phase encoding gradient magnetic field.

16. (Currently Amended) A magnetic resonance imaging method according
~~to as in~~ claim 15, wherein in said second pulse sequence, a gradient magnetic field for
slice encoding is generated in the same direction as ~~that of~~ said slice selecting gradient
magnetic field.

17. (Currently Amended) A magnetic resonance imaging method according
~~to as in~~ claim 15, wherein a time integral value of intensities of said flow pulses is
included among conditions of said flow pulses.

18. (Currently Amended) A magnetic resonance imaging method according
~~to as in~~ claim 15, wherein distinction between a rephase type and a dephase type of said
flow pulses is included among conditions of said flow pulses.

19. (Currently Amended) A magnetic resonance imaging method according
~~to as in~~ claim 15, wherein said first pulse sequence is repeatedly executed with alterations
of conditions of said flow pulses.

20. (New) An MRI system for obtaining an MRA image relating to a flowing fluid region of an object to be imaged in the absence of contrast agent in said object said system comprising:

a cardiac phase setting component configured to set a first cardiac phase and a second cardiac phase of a cardiac cycle of the object as first and second timings;

a scanning component configured to perform a first 3D scan at the first timing to acquire a first echo data set and a second 3D scan at the second timing to acquire a second echo data set, the second 3D scan being performed based on a pulse sequence which has a flow pulse in a phase encoding direction; and

an image producing component configured to produce a subtraction image from a first image and a second image, the first image being generated based on the first echo data set, the second image being generated based on the second echo data set.